AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of the claims in the application:

1. (Previously Presented) A rate controller for a video coder, comprising:

a target bits computer having inputs for complexity indicators for pictures of source video data, the target bits computer to calculate target bit rates for the pictures therein,

a buffer based quantizer computer to generate a quantizer estimate based on a fullness indicator from a transmit buffer of the video coder,

an activity based quantizer computer, having inputs for the quantizer estimate from the buffer based quantizer computer and for the source video data, to generate a quantizer selection therefrom,

wherein the buffer based quantizer computer generates the quantizer estimate from a comparison of the fullness indicator to a virtual fullness calculation based on target bit rate calculations and actual bit rates of prior frames,

wherein the buffer based quantizer computer comprises:

a virtual buffer fullness computer, including storage for target bitrate values, actual bitrate values and picture type assignments of prior coded pictures,

a comparator having inputs for the fullness indicator and an output of the virtual buffer fullness computer, and

quantizer mapper having an input for an output of the comparator and an output for the quantizer estimate,

wherein the comparator is a weighted comparator, having an input for a weighting value that determines a relative value adjustment between the fullness indicator and an output of the virtual buffer fullness computer, wherein the weighting value is set according to an application for which the video coder is to be used.

2. (Original) The rate controller of claim 1, wherein the rate controller generates a quantizer selection on a picture-by-picture basis.

3. (Original) The rate controller of claim 1, wherein when the picture is an I picture, the target bitrate T_i is determined by:

$$T_i = \max\left\{\frac{R}{\left(1+\frac{N_P X_P}{X_I K_P}+\frac{N_B X_B}{X_I K_B}\right)}, \frac{bitrate}{8 * picturerate}\right\}$$, where

N_P and N_B respectively represent the number of P and B pictures that appear in a group of frames,

X_I and X_P respectively represent complexity estimates for the I and P pictures in the group of frames,

K_P is a constant,

K_B is determined based on the complexity indicators,

bitrate represents the number of bits allocated for coding of the group of pictures, and

picturerate represents the number of pictures in the group of pictures.

4. (Original) The rate controller of claim 1, wherein when the picture is a P picture, the target bitrate T_p is determined by:

$$T_P = \max\left\{\frac{R}{\left(N_P+\frac{N_B K_P X_B}{K_B X_P}\right)}, \frac{bitrate}{8 * picturerate}\right\}$$, where

N_P and N_B respectively represent the number of P and B pictures that appear in a group of frames,

X_I and X_P respectively represent complexity estimates for the I and P pictures in the group of frames,

K_P is a constant,

K_B is determined based on the complexity indicators,

bitrate represents the number of bits allocated for coding of the group of pictures, and

picturerate represents the number of pictures in the group of pictures.

5. (Original) The rate controller of claim 1, wherein when the picture is a B picture, the target bitrate T_b is determined by:

$$T_B = \max\left\{\frac{R}{\left(N_B + \frac{N_P K_B X_P}{K_P X_B}\right)}, \frac{bitrate}{8 * picturerate}\right\}$$, where

N_P and N_B respectively represent the number of P and B pictures that appear in a group of frames,

X_I and X_P respectively represent complexity estimates for the I and P pictures in the group of frames,

K_P is a constant,

K_B is determined based on the complexity indicators,

bitrate represents the number of bits allocated for coding of the group of pictures, and

picturerate represents the number of pictures in the group of pictures.

6. (Canceled)

7. (Canceled)

8. (Canceled)

9. (Previously Presented) The rate controller of claim 1, wherein the quantizer mapper comprises a lookup table storing MPEG-based quantizer values.

10. (Previously Presented) The rate controller of claim 1, wherein the quantizer mapper comprises a lookup table storing H.264-based quantizer values.

11. (Previously Presented) A method of generating a quantizer for a new picture to be coded, comprising:

calculating a target bitrate for the picture based on the new picture's assigned coding type and complexity indicators of the picture,

estimating a virtual buffer fullness value based on target bitrates and actual coding rates of prior coded pictures of the same type as the new picture,

generating a buffer fullness indicator by weighting a comparison of an actual buffer fullness value to the virtual buffer fullness value, wherein the comparison is weighted by a variable *w* set according to an application for which the new picture is being coded and

generating a quantizer for the picture in response to the buffer fullness indicator.

12. (Original) The method of claim 11, wherein when the picture is an I picture, the target bitrate T_i is determined by:

$$T_i = \max\left\{\frac{R}{\left(1+\frac{N_P X_P}{X_I K_P}+\frac{N_B X_B}{X_I K_B}\right)}, \frac{bitrate}{8 * picturerate}\right\}$$, where

N_P and N_B respectively represent the number of P and B pictures that appear in a group of frames,

X_I and X_P respectively represent complexity estimates for the I and P pictures in the group of frames,

K_P is a constant,

K_B is determined based on the complexity indicators,

bitrate represents the number of bits allocated for coding of the group of pictures, and

picturerate represents the number of pictures in the group of pictures.

13. (Original) The method of claim 11, wherein when the picture is a P picture, the target bitrate T_p is determined by:

$$T_P = \max\left\{\frac{R}{\left(N_P+\frac{N_B K_P X_B}{K_B X_P}\right)}, \frac{bitrate}{8 * picturerate}\right\}$$, where

N_P and N_B respectively represent the number of P and B pictures that appear in a group of frames,

X_I and X_P respectively represent complexity estimates for the I and P pictures in the group of frames,

K_P is a constant,

K_B is determined based on the complexity indicators,

bitrate represents the number of bits allocated for coding of the group of pictures, and

picturerate represents the number of pictures in the group of pictures.

14. (Original) The method of claim 11,wherein when the picture is a B picture, the target bitrate T_b is determined by:

$$T_B = \max\left\{\frac{R}{\left(N_B + \frac{N_P K_B X_P}{K_P X_B}\right)}, \frac{bitrate}{8 * picturerate}\right\}$$, where

N_P and N_B respectively represent the number of P and B pictures that appear in a group of frames,

X_I and X_P respectively represent complexity estimates for the I and P pictures in the group of frames,

K_P is a constant,

K_B is determined based on the complexity indicators,

bitrate represents the number of bits allocated for coding of the group of pictures, and

picturerate represents the number of pictures in the group of pictures.

15. (Previously Presented) A rate control method, comprising:

comparing target bitrates of prior coded frames to actual coding bitrates of the frames to generate a virtual transmit buffer fullness indicator,

comparing the virtual transmit buffer fullness indicator to an actual transmit buffer fullness indicator, and

selecting a quantizer for a current picture based on the comparison of the fullness indicators,

wherein the comparison of buffer indicators comprises:

multiplying the virtual transmit buffer fullness indicator by a first weighting factor,

multiplying the actual transmit buffer fullness indicator by a second weighting factor, and

generating an overall fullness indicator representing a comparison of the weighted transmit buffer indicators,

wherein the first weighting factor and the second weighting factor are set according to a particular video coding application.

16. (Canceled)

17. (Previously Presented) The rate control method of claim 15, wherein:

w represents the first weighting factor, where w<1,

the second weighting factor has a value 1-w, and

the overall fullness indicator full has a value $full = bfst + w(vbfst - bfst)$,

where bfst represents the actual transmit buffer fullness indicator and vbfst represents the virtual transmit buffer fullness indicator.

18. (Original) The rate control method of claim 15, wherein the selecting comprises mapping a fullness value generated from the comparison of fullness indicators to a quantizer according to a lookup table.

19. (Original) The rate control method of claim 18, wherein the lookup table stores MPEG quantizer values, having a range from 1 to 31.

20. (Original) The rate control method of claim 18, wherein the lookup table stores H.264 quantizer values, having a range from 1 to 51.

21. (Previously Presented) A quantizer selection method, comprising:

calculating a normalized average activity level of a picture from on image information of the picture,

adjusting a base quantizer value according to the picture's normalized average activity level, and

selecting a quantizer value for the picture based on the adjusted quantizer value,

wherein the calculating comprises:

for a plurality of macroblocks in the picture, calculating variances of image data for a plurality of blocks therein,

from minimum variance levels of the macroblocks, calculating minimum activity levels of the macroblocks, wherein the minimum activity of each macroblock is calculated as:

actmin = 1+ min(blkvar1, blkvar2, blkvar3, blkvar4), where blkvar represents the variances of 8x8 blocks within a respective macroblock, and

normalizing the minimum activity levels of the macroblocks, wherein the normalized minimum activity per macroblock is calculated as:

$$actnorm = \frac{(2 \times act\min) + act\min avg}{act\min + (2 \times act\min 8avg)}$$

where actminavg is a sum of actmin values for all macroblocks in a previously processed picture and the actnorm values for all macroblocks in the picture are averaged to obtain the normalized average activity level of the picture.

22. (Canceled)

23. (Original) The quantizer selection method of claim 21, wherein the adjusting comprises multiplying the base quantizer value by a value of the activity level.

24. (Original) The quantizer selection method of claim 21, wherein the selecting comprises mapping the adjusted quantizer value to a value between 1 and 51 for H.264 coding applications.

25. (Original) The quantizer selection method of claim 21, wherein the selecting comprises mapping the adjusted quantizer value to a value between 1 and 31 for MPEG coding applications.